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THE REPRODUCTION AND DORMANCY OF *TERRAPENE MAJOR* IN NEW ORLEANS

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In the past a great many scattered observations on the reproduction and dormancy of turtles in general and box-turtles in particular have appeared in print. Almost without exception these reports have dealt with the northern and eastern species of box-turtle, *Terrapene carolina* Linnaeus. Therefore, because the observations made in a study in the New Orleans area dealt with a species living under different ecological conditions and presenting differences in habits, it is considered of value to permanently record the following data.

We are indebted to Dr. F. H. Wilson of Tulane University for reading and criticizing the manuscript and making several valued suggestions.

From the autumn months of 1934 through the spring of 1937 the authors confined individuals of *Terrapene major* Agassiz in two areas of approximately twenty-five square feet each, enclosed by board and wire fences. Into each area wash tubs were sunk and kept filled with water, and each area was planted with fleshy plants and vines to provide shaded parts. The earth was covered with decaying leaves and other vegetative matter. Daily observations were made and recorded in most cases. All of the turtles under observation, a total of twenty of both sexes, were collected in 1934 and 1936 near New Orleans in Jefferson and Orleans parishes, Louisiana.

Reproduction. For the most part the observations of the mating behavior and egg-laying of *Terrapene major* made by the authors were similar to those reported by Latham (1916, 1917), Murphy (1916), Cahn and Conder (1932), Ewing (1933, 1935), Ditmars (1934), Allard (1935), Frothingham (1936), Rosenberger (1936), Cahn (1937), Conant (1938), and probably others, for the eastern box-turtle, *T. carolina*.

It was noted, however, that mating, or at least the urge to mate, in *T. major* in this locality was coincident with certain typical climatological conditions. Temperature seemed to play the most important position among these; at the time of the matings the temperature recorded was usually between 70° and 80°F., the lowest and highest recorded being 50° and 90° respectively. Most mating attempts also took place when the atmosphere was at a relatively high humidity, such as is the case immediately after a heavy rain, or is common to the sultry spring mornings and late afternoons in New Orleans.

While optimum conditions existed in the majority of matings observed, either optimum temperature or humid conditions alone was capable of stimulating mating in several cases. Of these cases, three only resulted in complete coitus, and in each the absent condition was compensated for by some substitutions: in case one, where the temperature was optimum (slightly above 85° F.) and the humidity low (the air dry), mating occurred *in the water;* in case two, mating occurred *during a light rain* as the temperature fell from 70° to slightly less than 60° in about two hours; and, in case three, the mating occurred *in water which held its optimum warmth*, as the air temperature dropped to a low of 56°F.

It is remarkable to note that of the eighty-five attempts at mating actually observed, only fourteen resulted in complete coition, and three of these under the conditions described above.

On examining the individual turtles as they were collected, the authors were at a loss to explain the nicks which, almost without exception, marked deeply the nuchal and first marginal plates of the males' carapaces. Similar scars appeared also, though not nearly so large or so commonly as in the males, among the females. It was later observed that the scars on the males were due to the terrific, lunging bites which they make at one another during their fights; the males seeming to fight on the slightest, or no, provocation. The scars of the females were due to the post-mating carresses of their mates. Latham (1917) described antagonism between two male *T. carolina*, but did not mention any such scars.

Another interesting phenomenon, apparently hitherto unrecorded, was observed to occur usually after mating. The male would put his mate through a series of awkward gyrations which descriptively can be called "nose-rolling." With his head the male would shove the female over the ground, she rolling with much facility (having closed her plastron tightly) until finally the male would tire, or hunger or nightfall or another male would interfere. This was not the invariable procedure after mating, as it was often lacking or performed by another male, or it may even have taken place before coitus, or even without resulting in coitus at all.

Dormancy. That long time variations in the degree of activity of *Terrapene major* are dependent upon factors other than temperature is not suggested by our observations. Similar suggestions were made for *T. carolina* in the vicinity of Washington, D. C., by Wetmore (1920) and Allard (1935). Hence, *hibernation* and *aestivation* in so far as the terms apply to box-turtles can be loosely defined as states of torporous activity at low and high temperatures respectively. Hibernation at this latitude (30°N.) seemed to take place when the temperature dropped to the vicinity and below 65°F.

Hibernation, as may be expected from the variable winter temperatures of this locality and climate, is by no means permanent. For example, during February and March of 1935 there occured five periods of temperature ranging between 60° and 70°F. at intervals of roughly five or six days each. These periods, while lasting at the most for only five or six days themselves, were sufficient to draw all the box-turtles (males and females alike) from their burrows. During the other periods, which may be described as normal, the temperature ranged from 60° to 40°F. and rarely lower.

There seemed to be a difference in behavior between the sexes during these intervals. While at no time in these two months (February and March, 1935) was there a total absence of males above the surface of the terraria (there being three males out most of the time) the females made no appearance save during the recurrent periods of warm weather. On the whole it may be said that the females seemed far less disposed to leave their burrows and far more disposed to enter or dig than the males. A converse tendency on the part of the males to persist above ground was illustrated on numerous occasions by their remaining in the tubs of water (buried level to the ground's surface) whenever the tem-

perature dropped,* resorting to actual hibernation only when it remained low. On several occasions, however, several males in particular prolonged their aquatic hibernation by simply lying motionless in the water, head and feet withdrawn. In tentative explanation of this unique behavior it might be said that the turtles accidentally or instinctively entered the water because of its retention of a higher temperature than that of the surrounding air; then as the water lost its original warmth they became so torporous that they were unable to swim out and hibernate on land. Cahn (1933) described a similar hibernation on the part of five *T. ornata* which after most of the others had withdrawn beneath the ground, entered a shallow pond (some six inches in depth) and remained there all winter entirely quiescent. He did not mention in his account any difference in behavior between sexes, however.

When the authors' males stayed above ground during cold spells activity was reduced to a minimum, being limited to seeking out, in sluggish movements, the sunniest spots in the inclosures. During warmer intervals throughout January, February, and March, when both male and female individuals appeared, they readily took food; and there was frequent courting, and antagonism between the males during the later spring.

It can be concluded that hibernation in *T. major* is not complete, as it is in certain of the *Pseudemys* and related terrapin; that it is frequently suspended for several days by warm temperatures; and, also, that females appear more inclined to burrow, and once burrowed, to remain so, while the males appear to require more intense and persistent periods of cold to force them to burrow (if at all, since they remain quiescent in water).

After the early spring period of most intense courting, fighting, and mating has passed, the temperature increases (*i. e.* in May and June). In these months and throughout the summer and early autumn the greater part of the daily activity was observed to take place through the cool of the morning (from dawn to about 8 a. m.), and during the late afternoon and early evening (from just before sunset to darkness). The intervening time, especially when the temperature was above 90°F., was one of sluggishness and inactivity for both sexes. In this torporous state, which reached its culmination in mid-afternoon, they often refused food which they would have devoured readily five or six hours earlier or later.

The outstanding difference between winter and summer dormancy

*Individuals of *T. carolina* also have been reported abroad during midwinter by Nichols (1914), Allard (1935), and Conant (1938).

was that while the former was erratic and at the most periodic only when the temperature was so, the latter was sure to be at least diurnally periodic, subject of course, to interruption by a cooling rain or an abrupt drop in temperature.

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THE FIRST RECORD OF THE SNAKE, *HYPSIGLENA*, FROM NEW MEXICO

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On February 2, 1939 while Mr. Pearce Beach was attempting to smoke out a rabbit a small "sidewinder" appeared which was brought to the author. Upon examination, the snake turned out to be a rather small specimen of *Hypsiglena ochrorhynchus* Cope. The only published records noting this species in New Mexico are those of Bailey (1913) and Van Denburgh (1924). The former included this species in a list of reptiles occurring in New Mexico. The latter stated that the National Museum had a specimen labelled "New Mexico."

Letters were written to Drs. Vernon Bailey and Leonhard Stejneger of the National Museum in an effort to check the suspicion that both records were based on the same specimen and that without specific locality data. Dr. Bailey had nothing further to add. Dr. Stejneger wrote in part as follows: "Apparently the record of a specimen of this species by Van Denburgh as being in the National Museum rests on a mistake. He may have seen a card in our card index bearing the erroneous number of 9456, but that belongs to an unidentifiable young *Bufo* and tadpole collected by Dr. Loew in New Mexico in 1873. The young *Hypsiglena* without data, but much later tagged 9456 by mistake, is consequently from an unkown locality. As Bailey's reference to *Hypsiglena ochrorhynchus* from New Mexico apparently rests on the same erroneous reference as Van Denburgh's your specimen is apparently the first authentic record from the State of New Mexico."

The specimen in hand was taken February 2, 1939 about five miles southwest of Los Lunas in Valencia County, New Mexico from the mouth of a rabbit burrow by Mr. Pearce Beach. It was probably hibernating in this situation until disturbed by the heat and smoke of the smudge. The rabbit burrow was described as being in typical "mesa" land at the base of a fairly high clay bluff. The ground was partially covered by a snow of the previous night. It is now USNM 107,347.

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ADDITIONS TO THE HERPETOFAUNA OF KENTUCKY

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In November 1933, the Baker-Hunt Foundation Museum of Covington, Kentucky, published a brochure by Ralph Dury and Raymond S. Williams, entitled "Notes on Some Kentucky Amphibians and Reptiles" (Bulletin No. 1). This list enumerated fifty-two species, and together with previously published records brought the total number, known to inhabit the state, to sixty-two.

Forty species of reptiles and amphibians, never before authentically reported, have been added to this list. These new records were made possible by the field work of the authors and their associates, and by the published reports of other workers. Sixteen of the unpublished species are listed below.

The specimens reported on are in the collection of the Cincinnati Society of Natural History, unless otherwise specified; the numbers in parentheses indicate the number of specimens.

Amphiuma tridactylum Cuvier. McCracken Co., near Paducah; March 30, 1938; R. J. Fleetwood, collector, (1).

Plethodon richmondi Netting and Mittleman. Harlan Co., near Lynch; June 12, 1934; R. Dury and W. Goodpaster, collectors, (11). Carter Co., near Cascade Caves; Spring 1935, M. Adkins collector, (1). Campbell Co., near Covington; April 2, 1934; A. Graf, collector; Baker-Hunt Museum No. 59, (6). Kenton Co., Covington; May 24, 1931; S. McMillan, (10).

Siren lacertina Linnaeus. Fulton Co., near Reelfoot Lake; May 15, 1938; W. Goodpaster, collector, (1).

Hyla avivoca Viosca. Henderson Co., near Smith Mills; June 15, 1938; W. Gessing and W. Goodpaster, collectors, (8). Fulton Co., near Reelfoot Lake, July 15, 1938; M. V. Parker, collector, (5).

Hyla cinerea cinerea Schneider. Fulton Co., near Reelfoot Lake; May 15, 1938; W. Goodpaster, collector, (20).

Rana areolata Baird and Girard. McCracken Co., near Paducah; April 26, 1934; R. Conant, collector; Toledo Zoological Society No. 707-710, (3).

Farancia abacura reinwardtii Schlegel. Fulton Co., near Reelfoot Lake, June 15, 1937 and May 15, 1938; W. Goodpaster, collector, (4).

Diadophis punctatus stictogenys Cope. Fulton Co., near Reelfoot Lake; Summer 1937; M. V. Parker, collector, (1).

Natrix cyclopion cyclopion Dumeril and Bibron. Fulton Co., near Reelfoot Lake, May 15, 1938; W. Goodpaster, collector, (2).

Natrix rhombifera rhombifera Hallowell. Henderson Co., near Smith Mills; June 15, 1938; W. Goodpaster, collector, (10). Fulton Co., near Reelfoot Lake, collected in 1937-1938 by W. Goodpaster, (30).

Natrix sipedon confluens Blanchard. Fulton Co., near Reelfoot Lake, W. Goodpaster in 1937 and 1938, (13).

Natrix sipedon pleuralis Cope. Hopkins Co., near Madisonville; April 17, 1938; R. J. Fleetwood, collector, (1). Ohio County; 1936-1937; CCC workers, (1).

Agkistrodon piscivorous Lacepede. Fulton Co., near Reelfoot Lake; May 15, 1938; W. Goodpaster and C. Mikel, collectors, (3).

Graptemys pseudogeographica pseudogeographica Gray. Fulton Co., end of Reelfoot Lake; 1937-1938 W. Goodpaster, collector, (4). Fulton County, extreme north end of Reelfoot Lake, (15).

Pseudemys concinna heiroglyphica Holbrook. Fulton Co., north end of Reelfoot Lake; June 1937, W. Goodpaster, collector, (1).

TWO NEW LIZARDS OF THE GENUS *UTA*

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Incidental to a study of the lizards of the *Uta ornata* complex, two forms have been noticed which are sufficiently distinct to warrant subspecific and specific recognition; these being from Texas and Oaxaca respectively. Pending the publication of a paper which deals with all the members of the group in greater detail, the following descriptions and notes are offered.

Uta ornata schmidti subsp. nov.

pl. III, fig. 1

Holotype: USNM 32929, male, collected at Fort Davis, Jeff Davis Co., Texas, by V. Bailey, January 3, 1896.

Paratypes: Twenty four, as follows: CA 4867-72, MVZ 18967-8, USNM 32934-6, 92896-8, 103646, Brewster Co., Texas; USNM 32928, 32930-1, 11957 (2 spec.), Jeff Davis Co., Texas; USNM 30012, El Paso Co., Texas; USNM 32932-3, Presidio Co., Texas; MCZ 45589, Colonia Garcia, Chihuahua, Mexico.

Diagnosis: Closely related to *Uta ornata ornata,* but differing from that race as follows: Enlarged dorsal scales arranged more regularly; the inner series of enlarged dorsal scales not twice as large as those of the outer series; largest of the dorsal scales occasionally equal to, but more often smaller than, the enlarged, keeled scales of the antero-dorsal surfaces of the tibia and femur; enlarged dorsal scales commencing well caudad of a line joining the anterior points of insertion of the fore-limbs. Lateral fold usually incomplete when present. Dorsolateral series of tubercles and enlarged scales usually quite prominent. Elongated series of tubercles on neck somewhat more prominent. Coloration of both sexes similar, in most respects, to that of *ornata,* save that the heavy ventral mottling of the interhumeral and interfemoral areas found in *ornata* is regularly lacking in *schmidti,* or at best is represented by a light flecking of blue-gray. Measurements of holotype: Snout to posterior border of ear, 11.5 mm.; head width, 9 mm.; snout to vent, 44 mm.; hind-limb (insertion to tip of 4th toe, exclusive of nail), 31 mm.; tail, 70 mm.

Distribution: TEXAS: Brewster, Jeff Davis, El Paso, and Presidio Counties. MEXICO: Northern Chihuahua.

Remarks: Of the various subspecies of *Uta ornata, schmidti* most closely approaches the typical form. In the main, however, it is quite easily separated from *ornata.* Intergrades between *ornata* and *schmidti* have been noted from Langtry and Comstock, Val Verde Co., Texas. Insofar as I have been able to determine, *ornata* does not range west of the Pecos River; *schmidti* will undoubtedly be found to occupy the greater part of Texas to the west of the Pecos, and south of Lat. 32°. Certain specimens from Dona Ana and Otero Counties, New Mexico, appear to be of this subspecies, but are too poorly preserved to identify with certainty.

Specimens from northern Mexico are extremely uncommon in collections; apparently the only *bona fide* record for *schmidti* in Mexico other than the paratype listed, is that given by Smith (1935:178), who lists a single specimen of "*Uta ornata ornata*" from a point three miles south of Samalayuca, Chihuahua. As Smith specifically states that the specimen does not in any guise resemble his newly described *U. caerulea,* but rather is a typical *ornata,* I presume that it is a specimen of *schmidti,* on the basis of available locality records for both subspecies. Gadow's record (1905: 194) for *Uta elegans,* from Juarez, Chihuahua, which Smith (1935:179) interprets as probably being a specimen of *ornata (= schmidti)* may actually be an example of this subspecies; however I think it more probable that it is *U. stansburiana stejnegeri.*

Numerous specimens in the United States National Museum, with simply the data "Border", or "Mexico", are referable to *schmidti,* but as they lack any more explicit data they are useless for the purpose of further delineating the range of this form. It seems likely that further collecting in Chihuahua will disclose intergradation between *caerulea* and *schmidti.*

The subspecies is named for Karl Patterson Schmidt, with especial reference to his earlier study of the genus *Uta.*

Uta anonymorpha sp. nov.

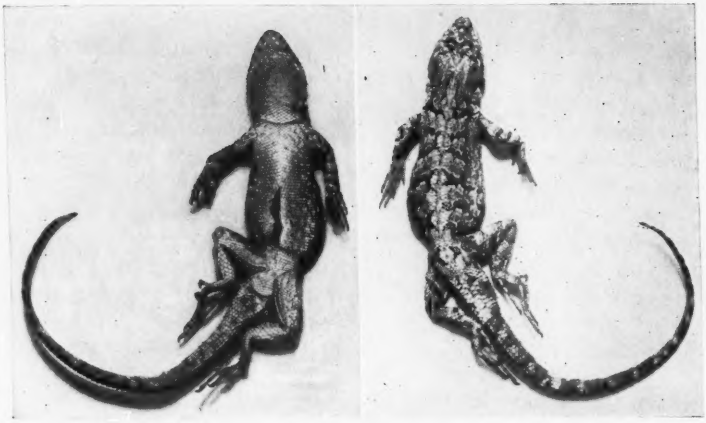
pl. III, fig. 2

Holotype: USNM 46988, male, collected near Tehuantepec, Oaxaca, Mexico, by E. W. Nelson and E. A. Goldman, October, 1899.

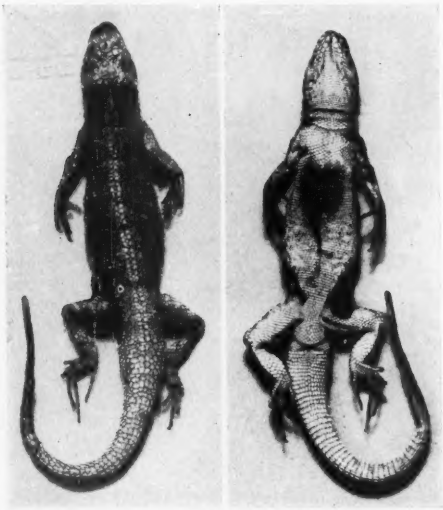
Paratypes: USNM 30095-7, same locality as type, but collected by Francis Sumichrast.

Diagnosis: Superficially similar to *Uta bi-carinata,* but characterized and differentiated as follows: The enlarged vertebral series of scales, and the scales external to them which are larger in size, commencing on

PLATE III



UTA ORNATA SCHMIDTI, subsp. nov.
Fig. 1 Male holotype from Fort Davis, Jeff Davis Co., Texas, USNM 32929 .
Actual length, snout to vent, 44 mm.



UTA ANONYMORPHA, sp. nov.
Fig. 2 Male holotype, Tehuantepec, Oaxaca, Mexico, USNM 46988.
Actual length, snout to vent, 50 mm.

the shoulders only slightly craniad of a line joining the anterior points of insertion of the fore-limbs; enlarged dorsals in a continuous series or but slightly encroached upon by a few of the small, granular scales of the back; enlarged dorsals smaller, less strongly carinated, and more regularly arranged than in *bi-carinata*. External to the enlarged dorsals is a sparse series of enlarged scales, a trifle larger in size than the scales of the vertebral series, but never approaching in size the larger enlarged dorsals; this outermost series of enlarged scales never in contact with the primary series of enlarged dorsals, but in contact at several points with the rather sparse and poorly developed tubercular and mucronate scales of the dorsolateral line through the medium of small, elongated, clusters of slightly enlarged, granular scales. Thoracic tubercles less prominent and not as well developed. Dorsolateral and lateral tubercles not as well developed, often not in clusters, but rather a single, enlarged tubercular scale surrounded by one or two large, mucronate scales. Ventrals mucronate and spinose, especially posteriorly; laterally, the ventral scales become distinctly carinated and prominently pavemented. Scales of the chin and throat smaller, flatter, and more generally pavemented; only those immediately anterior to the gular fold becoming elongated, imbricated, and somewhat pointed. Generally smaller, less rugose, and not as robust. Male and female coloration quite similar to that of *bi-carinata*, save that the males exhibit a tendency towards possessing abdominal blue patches which are reduced to small, posthumeral spots; coloration generally less intense. Measurements of holotype: Snout to posterior border of ear, 11.5 mm.; head width 9 mm.; snout to anus, 50 mm.; hind leg (insertion to tip of 4th toe, exclusive of nail), 27 mm.; tail (partially regenerated), 60 mm.

Distribution: Known with certainty only from the type locality.

Remarks: This form may possibly be a subspecies; a specimen from Tuchitan, Oaxaca, seems to be intermediate between *bi-carinata* and *anonymorpha*. Also, the specimen from Chasumba, Oaxaca, mentioned by Smith (1935:170), appears to differ in a few minor respects from the type series, and may also point towards intergradation. I hesitate to postulate on the relationships of *nelsoni* and *anonymorpha*, as I have seen only the type of the former species. On the basis of this single specimen, the two forms are quite distinct, *nelsoni* being immediately distinguishable by its comparatively rounded ventrals, and by the more regular series of lateral tubercles, which are more prominent and in greater number than in *anonymorpha*.

The distinction of *Uta anonymorpha* first became apparent in the course of certain comparative studies made on a large part of the available *bi-carinata* material in this country. Particularly noticeable, was a variance in several characters of importance in specimens from the southernmost reaches of the range, namely in Oaxacan examples. Certain of these differences had been previously reported on by Smith *(loc. cit.)*. A separation of the material into two groups, one representing the specimens from Oaxaca, the other from various other localities within the range of *bi-carinata*, readily disclosed that specimens from Michoacan, Morelos, and certain other states fitted Dumeril's type description (1856:549) much more closely than did the Oaxacan material. As Dumeril did not mention a type locality, I have retained the name *bi-carinata* for the northerly form, and described the form in Oaxaca as new. I have seen no specimens from the state of Oaxaca that can be considered *bi-carinata;* excluding this state, the range may be stated to include Puebla and Guerrero (Schmidt, 1921), Michoacan and Morelos (Smith, 1935).

Acknowledgements

I wish to express my gratitude to Drs. Leonhard Stejneger, Alexander Wetmore, and Doris M. Cochran, for the innumerable courtesies extended to me while visiting the National Museum, as well as in the course of a protracted correspondence. I would also acknowledge my appreciation of the many suggestions and kindnesses shown me by Dr. Herschel T. Gier, of the Department of Zoology of Ohio University, during many long discussions, and in the reading of the manuscript.

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REPTILES AND AMPHIBIANS FROM GEORGETOWN COUNTY, SOUTH CAROLINA

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Georgetown County is situated on the northern part of the South Carolina coast. In the eastern part of the county, the Waccamaw River and Winyah Bay cut off a narrow strip of land, locally known as Waccamaw Neck. During the past five years, I have visited this latter locality eleven times, spending ninety-five days there. All the forms listed were seen in the field during that time. Most of the collecting was done around Waverly Mills.

During the past five years I have seen many of the old natural habitats disturbed and, in some instances, destroyed by various public works and I hasten to present this list of reptiles and amphibians from what has been, until recently, an unspoiled section of the South Carolina low country. Unfortunately, drainage projects have reduced the numbers of some of these animals, notably *Ambystoma mabeei*, which we no longer find in certain of its former haunts.

My thanks are due to Dr. A. H. Wright and Dr. E. R. Dunn, who have seen many of the specimens and made suggestions which have proved most helpful in this work. I am also very grateful to Mr. E. B. Chamberlain of the Charleston Museum, who has made available their collections for comparison and additional notes, and to the good people of Waverly Mills, particularly Dr. and Mrs. Henry Norris, who have helped me in countless ways.

Amphiuma means. The "lamper eel" is sometimes found in the mud of the rice fields.

Titurus viridescens symmetrica. The striped newt is quite common in small permanent ponds. A good collection was made by pulling a seine through alligator holes in a cypress pond during the dry season. At this time only these deep holes contained water, with the result that many types of amphibians and reptiles were concentrated around them. The larvae were found in June and July. No collections have been made in May, but they would undoubtedly be found at that time.

Ambystoma mabeei. This recently described salamander has been found to be quite common in the region. It may be found in and around

cypress and gum swamps, usually in very wet places. When found out of the water, it seems sluggish and is easy to catch, but in the water it is very active. In the field this salamander might be mistaken for *Plethodon glutinosus* at first glance. The general ground color is dark gray or black, with many irregular light gray or white spots scattered over the back. Underparts are a brownish-gray, with white flecks on chin and throat and between forelegs, and on the sides. The larvae might be confused with those of *A. opacum*, owing to the presence of a row of light, unpigmented areas along the sides between the insertions of the limbs. The larvae of *A. mabeei* are light colored beneath, however, while *A. opacum* larvae are black on the ventral surface. Larvae taken on March 24, 1935, were kept alive, one transformed on April 1, the other four days later. At the time of transformation they measured 50mm. in total length.

Ambystoma opacum. Two marbled salamanders were turned up in December, 1937, by workmen digging a drainage ditch through a small cypress swamp.

Plethodon glutinosus. Only one specimen was taken. It was found in a patch of sphagnum near a large gum swamp.

Stereochilus marginatus. One specimen collected in a swamp near a running stream.

Manculus quadridigitatus quadridigitatus. Very common around the cypress swamps.

Eurycea bislineata cirrigera. More larvae were taken than adults. They were found in patches of moss in a swift stream.

Desmognathus fuscus auriculatus. Both adult and larval specimens were very abundant.

Siren lacertina. This species was collected by digging in the mud around deep holes in cypress ponds during the dry weather. Under these conditions they were found in large numbers.

Scaphiopus holbrookii holbrookii. On the night of February 25, 1935, with the temperature about 55° F., a light rain falling, these frogs and a large number of toads, *Bufo terrestris*, were found on a paved highway. The surface of the road was quite warm, and the frogs seemed to be resting there. On the evening of September 1, 1937, following heavy rains, we found young individuals along the same highway.

Bufo quercicus. Very common; large numbers were found breeding in ditches and ponds after rains in July, 1935.

Bufo terrestris terrestris. Very common; these toads were found

mating in April, 1935, and again after heavy rains in July of the same year. The eggs were found at the latter time.

Acris gryllus. Taken in large numbers at all seasons, with the exception of mid-winter.

Pseudacris nigrita nigrita. We heard these frogs calling on February 20, 1934, and February 24, 1935.

Pseudacris ocularis. We collected this species in April, 1934, and July, 1935.

Pseudacris ornata. Heard on December 30, 1937; January 2, and 3, 1936; February 20, 1934.

Hyla cinerea cinerea. The bell toad may be heard calling in the old rice fields at the close of any summer day, and the sound is perhaps the most characteristic one of the marshes at that season.

Hyla crucifer. Large numbers of "peepers" breed in February, March, and April.

Hyla femoralis. The "piney woods tree frog" is frequently heard in late afternoon throughout the summer. It may be found breeding in cypress ponds at that season.

Hyla gratiosa. Three males were taken from a flooded corn field in mid-July, 1933. Others were calling at the same time.

Hyla squirella. Very abundant.

Hyla versicolor versicolor. We have heard the tree toad calling at Waverly Mills after summer rains. It has been collected by Dr. C. Burt at Conway, Horry County, twenty miles north of Waverly Mills.

Rana catesbeiana. Common; it was heard calling on March 30, 1932; a mated pair was taken April, 2, 1935.

Rana clamitans. Rather common.

Rana sphenocephala. Abundant, breeding from early spring throughout the summer.

Microhyla carolinensis. Rather common; large numbers breed during the summer.

Alligator mississipiensis. Hide hunters have greatly reduced the numbers of the 'gator in recent years, but it may still be seen occasionally in creeks and rice field ditches. Large specimens are now very rare.

Anolis carolinensis. Probably the most abundant lizard of the region.

Ophisaurus ventralis. Very common, many being plowed up in early spring.

Cnemidophorus sexlineatus. Common in dry, sandy places.

Leiolopisma unicolor. Very abundant.

Eumeces laticeps. Common at almost all seasons of the year, even appearing on sunny days in mid-winter.

Abastor erythrogrammus. Probably owing to its burrowing habits, this serpent is not often seen.

Farancia abacura. Uncommon; only two specimens collected.

Diadophis punctatus punctatus. Common; the young are frequently taken in large numbers in the summer.

Heterodon contortrix. Very abundant, being frequently found in the late summer. One specimen of the black phase was brought to us.

Heterodon simus. Only a few of the southern hog-nose snakes were found.

Opheodrys aestivus. Occasional records.

Coluber constictor constrictor. Abundant.

Coluber flagellum flagellum. Uncommon. We have heard of several instances of coachwhips attacking people in the neighborhood!

Elaphe guttata. Common around barns and stables. It is often killed by those who confuse it with the copperhead snake.

Elaphe quadrivittata quadrivittata. Frequently found around buildings. Owing to its habit of occasionally taking eggs of domestic fowl, it is not well-liked.

Lampropeltis getulus getulus. Fairly common, and generally regarded as a beneficial species.

Cemophora coccinea. We have seen one specimen from the region. It was turned up by a plow in the early spring.

Natrix rigida. While digging in the mud of a cypress pond in search of *Siren* in July, 1935, we caught one of these snakes.

Natrix erythrogaster erythrogaster. One specimen was found dead beside the road in July, 1935. It was in good condition, being freshly killed, and was bright copper-colored ventrally.

Natrix sipedon fasciata. Very common. The ventral pattern of one young specimen was remarkable, in that there was a light semicircle on the mid-line of each of the scutes in the anterior third of the ventral series.

Natrix taxispilota. Large specimens are very common. Two over five feet in length were captured in herring nets set in tidal, fresh water creeks.

Seminatrix pygaea. We have had five individuals of this species, all from cypress swamps. Four were captured while we were digging for *Siren.* One was found beneath a partially submerged log which also sheltered a small *Farancia.*

Thamnophis sauritus sauritus. One specimen.

Thamnophis sirtalis sirtalis. Apparently not common.

Tantilla coronata. One record.

Micrurus fulvius fulvius. Two specimens, one turned up by a plow.

Agkistrodon mokasen. Very common on one old plantation, particularly around the stable.

Agkistrodon piscivorus. Very common.

Sistrurus miliarius miliarius. Occasionally found on the sand roads in the summer time.

Crotalus horridus atricaudatus. Not common in recent years. Descriptions of large rattlesnakes from the western part of the county indicate that *C. adamanteus* also might be recorded here. No such specimens have been seen by the writer.

Sternotherus odoratus. Common.

Kinosternon subrubrum subrubum. Very common.

Chelydra serpentina. Common in the creeks and rivers.

Clemmys guttata. Occasionally found in or near ponds in the flatwoods.

Terrapene carolina. Not rare.

Malaclemys centrata centrata. This species is ardently hunted, owing to its value as a table delicacy. The size limit required by law has saved it in this region. At present it is fairly common in the salt marshes.

Pseudemys scripta. Very abundant in the rivers, and in the ditches of the rice fields.

Deirochelys reticularia. This turtle was frequently taken in the seine in the cypress ponds.

Caretta caretta. Sea turtles are common in the salt creeks during July and many large females lay their eggs on the beaches during that month. Unfortunately, the law protecting these nests is not always obeyed, and many are raided for their eggs each year. Other species doubtless visit the coast of South Carolina during the summer months.

PHOTOGRAPHS OF SNAKE SLOUGHS

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The scalation of reptiles being of major importance in comparing specimens for determination, photographic records of detail repay in many instances the amount of work involved in making them.

I mounted several snake sloughs on glass slides and after inserting these in a photographic enlarging apparatus, printed from the desired portions as though they were ordinary negatives. This greatly facilitated inspection.

In many cases it was found that, to prevent folding, the upper labials had to be cut loose from each other and in some instances the eye shields had to be removed.

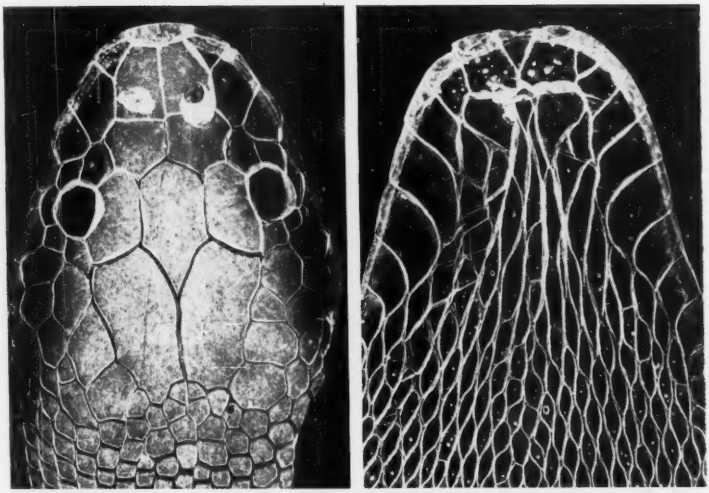
Canada balsam might be used in fastening the skin to the slide, but I found that stretching it on glass after soaking it in water for a few minutes caused it to dry perfectly flat and adhere sufficiently to be used in the projector. Contact prints can be made in the same manner. These provide a simple and permanent record of scale counts.

I have been able to definitely establish the presence of pigment. How it gets there is a problem. Perhaps research on the occurrence of pigment in the feathers of birds may show a possible course to follow, but in my opinion it can only be solved by a thorough investigation on sections of live snake skin in different phases before and during shedding.

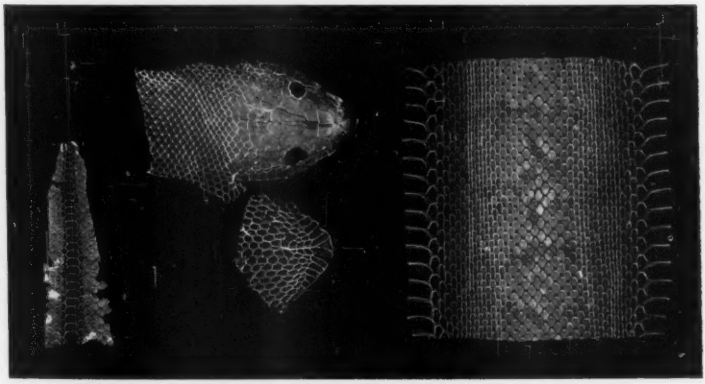
I am glad to communicate this simple method to those who might feel a need for employing it.

[This procedure probably involves some difficulties in distortion of the shed skin; however, it will probably have certain applications, best judged for individual cases. If this type of illustration is used it should certainly be mentioned in the legend of the plate—Ed. Note.]

PLATE IV



Pelamydrus platurus. An enlargement from the skin. (reduced). Note pores and scales on the valves in the nares.



Epicrates subflavus. A contact print from the skin. (reduced)

GLADWYN KINGSLEY NOBLE, 1894-1940: A HERPETOLOGICAL BIBLIOGRAPHY

WALTER L. NECKER
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Dr. G. K. Noble was born in Yonkers, New York, on September 20, 1894; he died suddenly on December 9, 1940, of Ludwig's quinsy in the Englewood, New Jersey, Hospital. His bachelor's and master's degrees from Harvard were received in 1917 and 1918 respectively; his doctorate from Columbia in 1922. He joined the staff of the American Museum of Natural History as Research Assistant in the Department of Herpetology in 1917 becoming head of the departmcnt in 1924. In 1928, the Department of Experimental Biology, which he conceived and fostered, was inaugurated, under his curatorship.

Dr. Noble's research was primarily in herpetological systematics until his interest in experimental biology took definite shape about 1924. His work was still primarily devoted to reptiles and amphibians although experimental, until the last few years when it broadened considerably to include vertebrates as a whole. *The Biology of the Amphibia,* is his most important work; although of a general nature, the book is an ideal model for compendia of its type which regrettably are lacking for most groups of animals.

The appended bibliography is thought to be complete for his herpetological writings except for popular reviews of herpetological books and annual reports of his department which to me seem out of place in such a bibliography. Proper and full cross-referring of abstracts is difficult; I have cited them as papers with references to the completed work when it coincides with a paper published in full.

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GLADWYN KINGSLEY NOBLE, 1894-1940

PORTRAIT BY HOWARD K. GLOYD

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THE SNAKE, *HALDEA STRIATULA* IN KANSAS

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In the course of field trips into the southeastern corner of Kansas during the past three years my students and I have seen five specimens of *Haldea striatula*. While this little snake has been taken in nearby parts of both Missouri and Oklahoma, this is believed to be the first record of its occurrence in Kansas. All specimens were found under small flat rocks near the tops of hillsides, three near the Spring River three miles East of Crestline, one from four miles north of Galena, and one from two miles north of Baxter Spriugs, all in Cherockee County. Two escaped and the other three were examined. One of these was taken April 19, 1935 and two March 28, 1936.

All three agree rather closely with Cope's description. (U. S. Nat. Mus., Ann. Rep., 1898: 1009, f. 272, 1900). All have 17 scale rows, with the scales near the dorsal midline very narrow and strongly keeled and with those of the outer row noticeably wider with keels practically obsolete. There is one internasal, one postocular, 5 upper labials with the third and fourth entering into the orbit, and 6 lower labials with the fourth and fifth much larger. The very long loreal lies above the second and third labials and forms, together with the prefrontal, the front part of the orbit. Two specimens have the anal divided; the third apparently so but with the divisions not separable. The ventrals and caudals are respectively 120-49, 121-48, and 117-48. The color is an even brownish gray above, and white (faint salmon pink in life) underneath.

TABLE I

Frequency Distribution of the Number Dorsal Body Blotches.

Subspecies	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	Average
Elaphe v. gloydi	1	2	3	7	8	13	18	14	20	11	7	3	-	-	-	-	-	-	-	-	-	-	-	-	34.49 (107)*
Elaphe v. vulpina	-	-	-	-	-	1	4	1	3	9	9	14	12	16	4	11	5	10	3	4	1	-	-	2	40.88 (109)*

*Number of counts on which average is based.

This table was inadvertently omitted from Roger Conant's paper, "A new subspecies of the Fox snake, *Elaphe vulpina* Baird and Girard". It should be inserted after page 14, no. 1, vol. 2.